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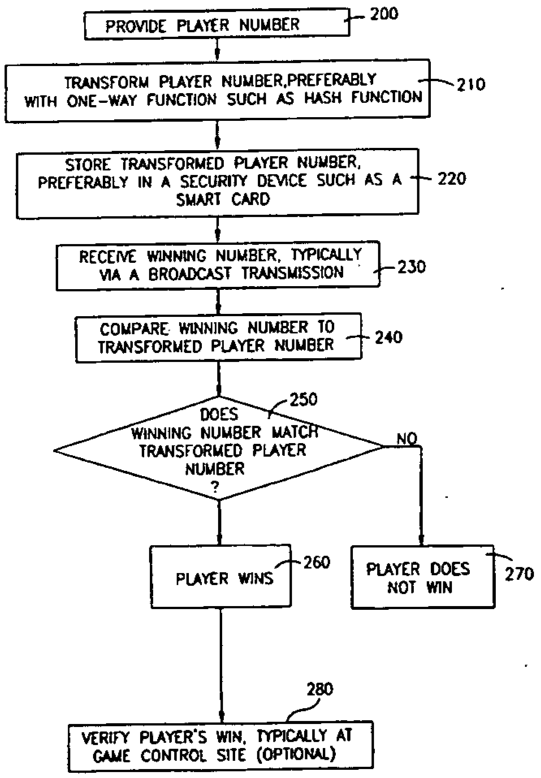
(57) Abstract

A game method for playing a game having a plurality of players, the method including, for at least one of the plurality of players: choosing a player number associated with the player, transforming the player number using a player number transformation function to produce a transformed number, storing the transformed number, providing a winning number, the winning number being identical for each of the plurality of players, comparing the winning number to the transformed number, and determining whether the player has won the game based on a result of the comparing step. Related apparatus and methods are also provided.


PROVIDE PLAYER NUMBER
200
TRANSFORM PLAYER NUMBER,PREFERABLY WITH ONE-WAY FUNCTION SUCH AS HASH FUNCTION
210
STORE TRANSFORMED PLAYER NUMBER, PREFERABLY IN A SECURITY DEVICE SUCH AS A SMART CARD
220
RECEIVE WINNING NUMBER, TYPICALLY VIA A BROADCAST TRANSMISSION
230
COMPARE WINNING NUMBER TO TRANSFORMED PLAYER NUMBER
240
DOES WINNING NUMBER MATCH TRANSFORMED PLAYER NUMBER ?
250
NO
PLAYER WINS
260
PLAYER DOES NOT WIN
270
280
VERIFY PLAYER'S WIN, TYPICALLY AT GAME CONTROL SITE (OPTIONAL)

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·GAME SYSTEM

FIELD OF THE INVENTION

The present invention relates to systems for playing games, and in particular to systems for playing lottery-type games.

BACKGROUND OF THE INVENTION

Games such as lottery-type games are well known in the art. Typically such games may be regulated or controlled by the state, but privately run, unregulated, and/or extra-legal lottery type games are also known.

Generally, lottery games are games of chance in which a player has an opportunity of winning a prize. A particularly widespread type of lottery game is known as a lotto game. In a lotto game, players are given the opportunity to choose one or more player numbers. When the winning number or numbers is determined, players receive a prize based on a comparison between the winning number or numbers and the player number of numbers previously chosen by the player. It is understood to be a fundamental rule of lotto games and similar games that the player number or numbers must be picked by the player before the winning number or numbers is announced.

There is significant potential for fraud in lotto games and similar games. For example, if a player could succeed in picking the player number after the winning number had already been announced, the player could fraudulently obtain a prize.

Various schemes for preventing such fraud are well-known in the art. Fig. 1A, for example, depicts one prior art method in which the player number is entered into a device under control of the lottery authorities, and typically stored in the device under central control for transmission or directly transmitted to a game control center, before the winning number is announced. It this way there is an audit trail to show, either in detail or according to the particular device which was associated with the lottery ticket, who picked the winning number; in effect, the player must register the player number with the game control center in order to participate in the game.

Another prior art scheme for preventing fraud, depicted in Fig. 1B, involves a departure from pure lotto format in that the player obtains, usually through purchase, a lottery card which is already imprinted with numbers. Typically, the buyer must remove an opaque substance printed on the card over the numbers in order to reveal the numbers. In the scheme of Fig. 1B, the player number is not chosen by the player and is in effect pre-registered with the game control center (not shown in Fig. 1B). Various schemes, well known in the art, are typically used to prevent alteration of the numbers on the card, including printing an encoded serial number on the card (not shown), the encoded serial number preferably encoding the player number. Such anti-alteration schemes may also be considered a form of pre-registration, in that the player number is already centrally registered when the card is sold.

US Patent 4,856,787 to Itkis describes a distributed game network in which a smart game card having an imbedded microprocessor keeps track of wagers and outcomes of the game. The smart game card also stores information identifying the contents of game card images present on a display in encoded form, such as an encoded serial number of the game card which encodes the numbers on the game card. Related systems are described in:

US Patents 4,455,025 and 4,624,462, both to Itkis.

US Patent 4,669,730 to Small describes an automatic sweepstakes type game in which an account number, preloaded into a card, is not only used to identify an account but also to allow the account holder to participate in a sweepstakes based on the account number.

US Patents 4,764,666 to Bergeron and 4,882,473 to Bergeron et al describe wagering systems using smart cards.

US Patent 4,906,826 to Spencer describes a usage promotion method for payment cards in which a computer selects transactions corresponding to specified criteria, eliminates all but a fraction of the selected transactions, and selects winning transactions by using bytes of the computer's system clock.

US Patent 5,179,517 to Sarbin et al describes a data transfer system for game machines using a smart card type data transfer unit.

US Patent 5,287,269 to Dorrough et al describes a system for accessing events, areas, and activities wherein debit and credit information is stored on an access card.

US Patent 5,373,440 to Cohen et al. describes a promotional game system using a coded game card, in which a game machine is not permitted to operate if the game card has been played within a designated time period.

US Patent 5,390,331 to Yui describes a data processing device in which an application program is stored in a removable memory device, the memory device storing an identification code.

US Patents 5,457,306 and 5,038,022 to Lucero describe a gaming machine operable with a charge card .

US Patent 5,458,333 to Takemoto et al. describes a game parlor system which uses credit and adjustment media, in which credit and game result information are written to media.

US Patents 5,575,374 and 5,697,482 to Orus et al describe a game machine with an electronic payment mechanism.

US Patent 5,577,959 to Takemoto et al describes a game system in which credit information and other information are stored on a game media.

US Patent 5,611,730 to Weiss describes a progressive gaming system usable in multiple remote sites, such as casino sites.

US Patent 5,613,912 to Slater describes a bet tracking system for tracking betting activity at gaming tables.

US Patent 5,655,966 to Werdin, Jr., et al describes a credit-card based gambling system for use in bartop gaming.

US Patent 5,674,128 to Holch et al describes a cashless computerized video game system, in which a player who makes a play must wait until the end of an interval to receive the random number which determines a win or a loss for that play.

US Patent 5,702,304 to Acres et al describes a system for networked gaming in which reconfiguration commands are transmitted to gaming devices.

Other prior art patents in the gaming field include the following:

US Patent 4,467,424 to Hedges et al;

US Patent 4,996,705 to Entenmann et al; and

US Patents 5,051,822 and 5,181,107, both to Rhoades.

Conference Proceedings of SCAT '89 (Smart Cart Applications & Technology) and ASIT '89 (Advanced Security & Identification Technology), pp. 165 - 182, describes use of smart cards in gaming systems.

Cryptographic techniques are described in Bruce Schneier, Applied Cryptography, 2nd Edition.

The disclosures of all references mentioned above and throughout the present specification are hereby incorporated herein by reference.

SUMMARY OF THE INVENTION

The present invention seeks to provide an improved game system, particularly a system for use with lotto games and similar lottery games.

In the present invention, a player is allowed to choose their own number for participation in a game, as is typical in the case of lotto games, as described above. Anti-fraud methods not involving pre-registration are employed to discourage fraud by players.

Generally, in a first preferred embodiment of the present invention, the player number is transformed by a transformation function, such as a one-way function or hash function described below, into a transformed number. The transformed number is ultimately compared with a winning number to determine a winner. Preferably, the transformation function is chosen so that it will be very difficult to invert; that is, given only the transformation function and the transformed number, it will be difficult to find the player number. Furthermore, in the case of a significantly large prize, a player is required to present the player number, the transformation function, and the transformed number in order to collect the prize. Thus, since a fraudulent player will not be able to compute the player number, he will not be able to fraudulently claim to have won.

Generally, in a second preferred embodiment of the present invention, the player number is stored in secure storage and steps are taken to prevent storage or alteration of a number after a pre-defined time which is before the time when the winning number is announced.

There is thus provided in accordance with a preferred embodiment of the present invention a game method for playing a game having a plurality of players, the method including, for at least one of the plurality of players, choosing a player number associated with the player, transforming the player number using a player number transformation function to produce a transformed number, storing the transformed number, providing a winning number, the winning number being identical for each of the plurality of players, comparing the winning number to the transformed number, and determining whether the player has won the game based on a result of the comparing step.

Further in accordance with a preferred embodiment of the present invention the player number transformation function includes a one-way function.

Still further in accordance with a preferred embodiment of the present invention the player number transformation function includes a combined function performing the following steps: applying a one-way function to the player number to produce an output, choosing at least one digit of the player number, choosing at least one digit of the output, and combining the at least one digit of the player number and the at least one digit of the output to produce the transformed number.

Additionally in accordance with a preferred embodiment of the present invention the one-way function includes a hash function.

Moreover in accordance with a preferred embodiment of the present invention the method includes providing a security device, the transforming step being carried out within the security device.

Further in accordance with a preferred embodiment of the present invention the storing step includes storing the transformed number within the security device.

Still further in accordance with a preferred embodiment of the present invention the security device includes a removable security device.

Additionally in accordance with a preferred embodiment of the present invention the removable security device includes a smart card.

Moreover in accordance with a preferred embodiment of the present invention the method also includes transporting the removable security device to a verification location, and verifying the removable security device at the verification location.

Further in accordance with a preferred embodiment of the present invention the method also includes awarding a prize to the player based, at least in part, on a result of the determining step.

Still further in accordance with a preferred embodiment of the present invention the method also includes awarding a prize to the player based, at least in part, on both a result of the determining step and a result of the verifying step.

Additionally in accordance with a preferred embodiment of the present invention the step of providing a winning number includes broadcasting the winning number.

Moreover in accordance with a preferred embodiment of the present invention each of the choosing step, the transforming step, and the storing step is performed, for each of the plurality of players, at most once during a game.

Further in accordance with a preferred embodiment of the present invention at least one of the choosing step, the transforming step, and the storing step is performed, for each of the plurality of players, at most once during a game.

Still further in accordance with a preferred embodiment of the present invention the method also includes fixing an ending time, preventing at least one of the choosing step, the transforming step, and the storing step from being performed after the ending time, and broadcasting the winning number after the ending time.

Additionally in accordance with a preferred embodiment of the present invention the at least one of the plurality of players includes a first player and a second player, and the player number transformation function for the first player and the player number transformation function for the second player are not identical.

Moreover in accordance with a preferred embodiment of the present invention the at least one of the plurality of players includes at least two players, and for any first player and any second player from among the at least two players, the player number transformation function for the first player and the player number transformation function for the second player are not identical.

There is also provided in accordance with another preferred embodiment of the present invention game apparatus for playing a game having a plurality of players, in which each player is associated with a player number and a winning number is used to determine a winner of the game, the apparatus including number input apparatus for receiving a player number, transformation apparatus for transforming the player number using a player number transformation function to produce a transformed number, transformed number storage apparatus for storing the transformed number, comparing apparatus for comparing the winning number to the transformed number and producing a result, and winner determining apparatus for determining whether a player associated with the player number has won the game based, at least in part, on the result produced by the comparing apparatus.

Further in accordance with a preferred embodiment of the present invention the game apparatus also includes a security device, and the security device includes the transformation apparatus.

Still further in accordance with a preferred embodiment of the present invention the security device also includes the transformed number storage apparatus.

Additionally in accordance with a preferred embodiment of the present invention the security device includes a removable security device.

Moreover in accordance with a preferred embodiment of the present invention the removable security device includes a smart card.

Further in accordance with a preferred embodiment of the present invention the player number transformation function includes a one-way function.

Still further in accordance with a preferred embodiment of the present invention the player number transformation function includes a combined function operative to apply a one-way function to the player number to produce an output, choose at least one digit of the player number, choose at least one digit of the output, and combine the at least one digit of the player number and the at least one digit of the output to produce the transformed number.

Additionally in accordance with a preferred embodiment of the present invention the one-way function includes a hash function.

There is also provided in accordance with another preferred embodiment of the present invention a method for determining a winner of a game, the method including providing a player number associated with a player, transforming the player number using a player number transformation function to produce a transformed number, producing a winning number, and determining whether the player is a winner of the game by comparing the winning number to the transformed number.

There is also provided in accordance with another preferred embodiment of the present invention a method for determining a winner of a game, the method including providing a player number associated with a player, storing the player number in a security device, fixing an ending time, preventing the storing step from being performed after the ending time, providing a winning number, comparing the stored player number to the winning number, and determining whether the player has won the game based on a result of the comparing step.

There is also provided in accordance with another preferred embodiment of the present invention a method for determining a winner of a game, the method including a player choosing a player number, providing a winning number, comparing the player number to the winning number, and determining whether the player has won the game based on a result of the comparing step, wherein the player number is not registered at a game control location prior to performing the determining step.

There is also provided in accordance with another preferred embodiment of the present invention defeating apparatus for defeating time stamp apparatus in which a plurality of messages including a time stamp message is externally supplied to a utilization device, the defeating apparatus including an incoming buffer for receiving and storing the plurality of messages, and a time stamp filter for delaying delivery of the time stamp message.

There is also provided in accordance with another preferred embodiment of the present invention a method for defeating a time stamp based anti-cheating method in which a plurality of messages including a time stamp message is supplied, the method for defeating including receiving and storing the plurality of messages, and delaying delivery of the time stamp message.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description, taken in conjunction with the drawings in which:

Figs. 1A and 1B are simplified partly pictorial, partly block diagram illustrations of prior art game systems;

Figs. 2A and 2B, taken together, comprise a simplified partly pictorial, partly block diagram illustration of a game system constructed and operative in accordance with a preferred embodiment of the present invention;

Fig. 3 is a simplified flowchart illustration of a preferred method of operation of the apparatus of Figs. 2A and 2B;

Figs. 4A and 4B, taken together, comprise a simplified partly pictorial, block diagram illustrations of a game control system constructed and operative in accordance with an alternative preferred embodiment of the present invention;

Fig. 5 is a simplified flowchart illustration of a preferred method of operation of the apparatus of Figs. 4A and 4B;

Fig. 6 is a block diagram illustration of game system time control defeating apparatus constructed and operative in accordance with a further alternative preferred embodiment of the present invention; and

Fig. 7 is a simplified flowchart illustration of a preferred method of operation of the apparatus of Fig. 6.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Reference is now made to Figs 2A and 2B which, taken together, comprise a simplified partly pictorial, partly block diagram illustration of a game system constructed and operative in accordance with a preferred embodiment of the present invention.

The system of Figs. 2A and 2B preferably comprises a display device 100 comprising a display 105, an input device 110, a communications interface device 120, and a security device 130.

In Figs. 2A and 2B certain elements of the system are depicted, for simplicity of description, as elements of a television system such as a subscriber television system. Specifically, the display device 100 is depicted as a television comprising the display 105; the input device 110 is depicted as a television remote control; the communications interface device 120 is depicted as a television IRD (integrated receiver-decoder), as is well known in the art of subscriber television; and the security device 130 is depicted as a smart card, as is also well known in the art of subscriber television. The depiction of the above-mentioned elements as elements of a television system is by way of example of one preferred embodiment only, and is not meant to be limiting, it being appreciated that a wide variety of other implementations are possible, including, for example, an implementation as a computer system and an implementation as a stand-alone gaming system.

For purposes of simplicity of description, the example of a television system may be used throughout the current specification, it being understood that the generality of the present invention is not limited thereby.

The display device 100 may comprise, for example any suitable television receiver equipped with a suitable display 105. The input device 110 may comprise any suitable input device such as, for example, a remote control compatible with the display device 100, as is well known in the art.

The communications interface 120 may comprise, for example, any suitable communications interface such as, for example, a suitable IRD operative to:

receive signals, typically including television signals, as are well known in the art, and game signals, as described below, both typically transmitted by a headend 140 via any suitable means, such as satellite transmission or cable transmission, as are well known in the art;

optionally, to decode encoded encrypted signals with the assistance of the security device 130, as is well-known in the art;

to interact with the security device 130 in the course of playing a game, as described below; and

to produce display signals suitable for input to the display device 100, as is well-known in the art.

It is appreciated that a particular communications device 120 is preferably chosen to be compatible with the other components of the system, as is well known in the art.

The security device 130 may comprise, for example, a suitable smart card similar to smart cards currently in use in commercially-available subscriber television systems. In addition to conventional elements of commercially available smart cards, the security device 130 preferably comprises transformation apparatus 145 and transformed number storage apparatus 150, which are preferably operative as described below and which may be implemented in hardware, preferably in an integrated circuit device protected against external tampering, as is well known in the art, or by other means.

It is appreciated that the transformation apparatus 145 and the transformed number storage apparatus 150 may be comprised in one or more other elements of the system, but an implementation in which the transformation apparatus 145 and the transformed number storage apparatus 150 are comprised in the security device 130 is believed to be preferred, particularly in a case where the security device 130 comprises a removable security device such as a smart card. Using the security device 130 is believed to assist in providing desirable qualities of the game system of Figs. 2A and 2B, such as tamper resistance and ease of use.

The operation of the apparatus of Figs. 2A and 2B is now briefly described. A user who wishes to participate in a game, such as a lotto-type game, enters a player number using the input device 110. The player number is communicated to the security device 130, using methods well known in the art, and is processed by the transformation apparatus 145. The transformation apparatus 145 is operative to transform the player number using a transformation function, such as a one-way function or hash function described below, into a transformed player number. One particular example of an appropriate transformation function is the MD5 function, described in Bruce Schneier, Applied Cryptography, 2nd Edition, referred to above, at pages 436 - 441.

Preferably, the transformation apparatus 145 communicates the transformed player number to the transformed number storage apparatus 150, which stores the transformed player number. Preferably, to discourage dishonest playing of the game, the transformation number apparatus 145 and/or the transformed number storage apparatus 150 only allow transformation and/or storage of a number once per game. Preferably, the transformed player number is shown on the display 105. Preferably, the player number is also stored in the security device 130, either in the transformed number storage apparatus 150 or elsewhere.

As seen in Fig. 2B, at some time, typically a predefined time, subsequent to choice of the player number and storage of the transformed player number in the transformed number storage apparatus 150, a winning number 160 is chosen and is preferably transmitted to the game system, typically to the security device 130. The winning number 160 is then compared to the transformed player number stored in the transformed number storage apparatus 150 and a determination is made as to whether the player has won the game. Typically, the criteria of winning is that the winning number 160 matches the number stored in the transformed number storage apparatus 150, but any other appropriate determination method, such as matching some digits between the winning number 160 and the transformed player number, may be used.

Typically, in the case of a significantly large prize, a player is required to present the security device 130 to some central game authority. Since the security device 130 preferably comprises the player number, the transformation function within the transformation apparatus 145, and the transformed number within the transformed number storage apparatus 150, the player in effect must produce all of these in order to collect the prize. It is appreciated that the transformation function for each player will, in this case, be preferably known to the central game authority and will be different for different players; preferably, no two players will be assigned the same transformation function. Thus, since a fraudulent player will typically not be able to produce all of these items, he will not be able to fraudulently claim to have won.

It is appreciated that the apparatus and method of the present invention generally allow a lotto-type game to be played in a tamper resistant manner while allowing a player to choose a player number and not requiring the number to be transmitted to any outside authority such as a central game authority.

Reference is now made to Fig. 3, which is a simplified flowchart illustration of a preferred method of operation of the apparatus of Figs. 2A and 2B. The method of Fig. 3 preferably comprises the following steps:

A player number is provided (step 200). As explained above, the player number is the number which will be played in a game, typically a lotto-type game. Preferably, the player is allowed to choose his own player number. Alternatively, any of a wide variety of methods may be used for choosing a player number. For example, any of the following methods may be used: a player number may be randomly generated by any appropriate component of the system of Figs. 2A and 2B; a player's favorite number may be stored and automatically provided by any appropriate component of the system of Figs. 2A and 2B; and a list of player numbers, including favorite numbers, numbers previously played, or other numbers may be stored and either one number may be automatically provided by any appropriate component of the system of Figs. 2A and 2B or a list of numbers may be provided to the player for making a choice.

It is appreciated that a player may play more than one number, typically at an increased cost.

The player number is transformed using a transformation function, preferably a one-way function such as a hash function, yielding a transformed player number (step 210). One way functions, such as hash functions are well known in the art and provide a method for transforming a first number into a second number in such a way that the inverse function, to transform the second number into the first number, is unknown, is difficult to know, or does not exist.

Preferably, the transformation function is kept secret. It is appreciated that, due to the nature of preferred one-way transformation functions, even if the transformation function were known to the player it would be extremely difficult to compute an inverse of the transformation function, which inverse could be used to cheat in the game as described below.

Computing an inverse for a particular value of the function, such as a winning value of the function would be extremely difficult, as previously described, using conventional means such as, for example, trying a multiplicity of inputs to the function one after another until an input is found which yields the particular value. However, it is believed that advanced contemporary cryptanalytic means such as, for example, using a very large number of computers to provide inputs to the function in parallel could ultimately defeat any reasonable one-way function.

Because of the existence of possible cryptanalytic attacks on the one-way function, it is preferred to perform the one-way function entirely within a security device, that is, a tamper-resistant device which is capable of computing the function. Typically, a smart card will be used as the security device, although it is appreciated that a wide variety of other devices may be used. In addition to having the basic characteristics necessary for performing as a security device, a smart card has the advantage of being very well known. In particular, it is well known to store a one-way function, such as a function used for interpreting an ECM in a subscriber television system, within a smart card.

It is further appreciated that it would be preferable for different players to have different transformation functions, and especially for each player to have a unique transformation function different from that of every other player. In this way, if an unscrupulous player should succeed in tampering with one security device in such a way as to determine the transformation function associated with the security device, the unscrupulous player could not make use of this information in conjunction with security devices belonging to other players. The advantage of using a unique transformation function is believed to be especially great in a case where tampering by an unscrupulous player includes destructive tampering with the security device.

It is appreciated that, in addition to applying a preferred function such as a one-way function to the player number, other functions may additionally be applied in obtaining the transformed player number. In particular, it may be preferred to take one or more digits of the output of the function, such as a one way function, and combine the one or more digits of the output together with one or more digits of the player number, to produce the transformed player number. The method of combining one or more digits of the function output with one or more digits of the player number may be particularly advantageous in a case where the player may prefer to see that one or more digits of the original player number are used, together with one or more digits output by the function, in playing the game.

The transformed number is stored (step 220). The transformed number may be stored in a conventional memory, but preferably the transformed number is stored in a security device, such as a smart card, similar to the security device discussed above with reference to step 210. The security device may be the same security device, discussed above with reference to step 210, in which the transformed number is preferably computed, or may be another security device of the same or similar type. For reasons of economy, it is believed that using the same security device is preferred.

A winning number, chosen by any appropriate means such as random generation, is received, typically via a broadcast transmission (step 230). The winning number is compared to the transformed player number (step 240). If the winning number matches the transformed player number or, according to the rules of whatever game is being played, partially matches the transformed player number, the player wins (step 260); otherwise, the player loses (step 270). In a case where the player wins (step 260), it is appreciated that a prize may be provided by any appropriate means, including, without limitation: awarding credit for further game playing; awarding credit for other purposes, such as purchase of entertainment; entitling the player to receive a prize at a later date; and sending a prize to the player.

The method of Fig. 3 through steps 260 and 270 is believed to be acceptable when the prize being awarded to the winning player is small. However, because of possibilities of tampering by unscrupulous players, such as the possibilities referred to above, it would be desirable, in a case where the prize being awarded to the winning player is large, to verify that the player's win is legitimate. The definitions of "large" and "small" in this context depend on the estimated cost of tampering, the size of the prize, and the extent to which the organizer of the game is willing to accept fraud.

Preferably, particularly in the case referred to above of large prizes, the player's win is verified, typically at a game control site (step 280). Preferably, verification comprises: verifying that the transformation function which the player has is the transformation function which the player is authorized to have; verifying that the player number, when input to the transformation function, yields the transformed player number; and verifying, typically by physical evidence, that the card has not been tampered with.

Reference is now made to Figs. 4A and 4B which, taken together, comprise a simplified partly pictorial, block diagram illustration of a game control system constructed and operative in accordance with an alternative preferred embodiment of the present invention. The system of Figs. 4A and 4B is similar to that of Figs. 2A and 2B, except as described below.

In the system of Figs. 4A and 4B a first time stamp message 290 is sent, typically from the headend 140, at a first time T1 indicating that the game may now be played. Typically, the first time stamp message 290 may include an instruction to the security device 130, typically an encoded instruction, instructing the security device 130 to allow the game to be played. The time stamp message 290 preferably comprises time information indicating the time of start of the game.

The security device 130 preferably comprises a time storage device 300 which may be operative to store information such as a time at which a transformed player number is stored in the transformed number storage apparatus 150.

As seen in Fig. 4B a second time stamp message 310 is typically sent from the headend 140 at a second time T2, indicating that the time for playing the game is over. Typically, the second time stamp message 310 may include an instruction to the security device 130, typically an encoded instruction, instructing the security device 130 to prevent the game from being played, that is, to prevent a player number from being chosen and/or to prevent a transformed player number from being stored.

It is appreciated that a time stored in the time storage device 300 may, after conclusion of the game, be checked, typically at a game control site, to ensure that a player number was not chosen outside of the allowed period of time. In this way, unscrupulous users can be prevented from playing the game after the winning number is already known.

It is appreciated that in the embodiment of Figs. 4A and 4B the timing mechanisms described above may be used with storage of the player number itself rather than storage of the transformed player number, but it is believed that storing the transformed player number is preferred.

Reference is now made to Fig. 5, which is a simplified flowchart illustration of a preferred method of operation of the apparatus of Figs. 4A and 4B. The method of Fig. 5 is self explanatory with reference to the above discussion of Figs. 4A and 4B.

It is appreciated that an unscrupulous player may attempt to defeat the system of Figs. 4A and 4B. Reference is now made to Fig. 6, which is a block diagram illustration of game system time control defeating apparatus constructed and operative in accordance with a further alternative preferred embodiment of the present invention. The apparatus of Fig. 6 comprises time control defeating apparatus 320.

The time control defeating apparatus 320 typically comprises an incoming message buffer 330 and a time stamp filter 340, the time stamp filter 340 being operative to identify and delay the transmission onward of certain time stamp messages comprised in the incoming message buffer 340. Preferably the time stamp filter 340 is operative to prevent timely delivery of the second time stamp message 310, thus affording an unscrupulous user an additional opportunity to play the game, possible after the winning number has already been announced.

In operation, the apparatus of Fig. 6 would typically be installed between the headend 140 and the communications device 120 of Figs. 2A, 2B, 4A, and/or 4B.

It is appreciated that countermeasures to the time control defeating apparatus 320 are possible such as, for example, independently determining, typically within the security apparatus 130, the time at which a transformed game number is stored in the transformed number storage apparatus 150.

Reference is now made to Fig. 7, which is a simplified flowchart illustration of a preferred method of operation of the apparatus of Fig. 6. The method of Fig. 7 is self explanatory with reference to the above discussion of Fig. 6.

It is appreciated that various features of the invention which are, for clarity, described in the contexts of separate embodiments may also be provided in combination in a single embodiment. Conversely, various features of the invention which are, for brevity, described in the context of a single embodiment may also be provided separately or in any suitable subcombination.

It will be appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and described hereinabove. Rather the scope of the invention is defined only by the claims which follow:

What is claimed is:

CLAIMS

1. A game method for playing a game having a plurality of players, the method comprising:

for at least one of the plurality of players:

choosing a player number associated with the player;

transforming the player number using a player number transformation function to produce a transformed number;

storing the transformed number;

providing a winning number, the winning number being identical for each of the plurality of players;

comparing the winning number to the transformed number; and

determining whether the player has won the game based on a result of the comparing step.

2. A method according to claim 1 and wherein the player number transformation function comprises a one-way function.

3. A method according to claim 2 and wherein the player number transformation function comprises a combined function performing the following steps:

applying a one-way function to the player number to produce an output;

choosing at least one digit of the player number;

choosing at least one digit of the output; and

combining the at least one digit of the player number and the at least one digit of the output to produce the transformed number.

4. A method according to claim 2 or claim 3 and wherein the one-way function comprises a hash function.

5. A method according to any of the above claims and also comprising:

providing a security device,

wherein the transforming step is carried out within the security device.

6. A method according to claim 5 and wherein the storing step comprises storing the transformed number within the security device.

7. A method according to claim 5 or claim 6 and wherein the security device comprises a removable security device.

8. A method according to claim 7 and wherein the removable security device comprises a smart card.

9. A method according to claim 7 or claim 8 and also comprising:

transporting the removable security device to a verification location; and

verifying the removable security device at the verification location.

10. A method according to any of the above claims and also comprising:

awarding a prize to the player based, at least in part, on a result of the determining step.

11. A method according to claim 9 and also comprising:

awarding a prize to the player based, at least in part, on both a result of the determining step and a result of the verifying step.

12. A method according to any of the above claims and wherein the step of providing a winning number comprises broadcasting the winning number.

13. A method according to any of the above claims and wherein each of the choosing step, the transforming step, and the storing step is performed, for each of the plurality of players, at most once during a game.

14. A method according to any of claims 1 - 12 and wherein at least one of the choosing step, the transforming step, and the storing step is performed, for each of the plurality of players, at most once during a game.

15. A method according to any of the above claims and also comprising:

fixing an ending time;

preventing at least one of the choosing step, the transforming step, and the storing step from being performed after the ending time; and

broadcasting the winning number after the ending time.

16. A method according to any of the above claims and wherein the at least one of the plurality of players comprises a first player and a second player, and

the player number transformation function for the first player and the player number transformation function for the second player are not identical.

17. A method according to any of the above claims and wherein the at least one of the plurality of players comprises at least two players, and

for any first player and any second player from among the at least two players, the player number transformation function for the first player and the player number transformation function for the second player are not identical.

18. Game apparatus for playing a game having a plurality of players, in which each player is associated with a player number and a winning number is used to determine a winner of the game, the apparatus comprising:

number input apparatus for receiving a player number;

transformation apparatus for transforming the player number using a player number transformation function to produce a transformed number;

transformed number storage apparatus for storing the transformed number;

comparing apparatus for comparing the winning number to the transformed number and producing a result; and

winner determining apparatus for determining whether a player associated with the player number has won the game based, at least in part, on the result produced by the comparing apparatus.

19. Apparatus according to claim 18 and also comprising a security device,

and wherein the security device comprises the transformation apparatus.

20. Apparatus according to claim 19 and wherein the security device also comprises the transformed number storage apparatus.

21. Apparatus according to claim 19 or claim 20 and wherein the security device comprises a removable security device.

22. Apparatus according to claim 21 and wherein the removable security device comprises a smart card.

23. Apparatus according to any of claims 18 - 22 and wherein the player number transformation function comprises a one-way function.

24. Apparatus according to claim 23 and wherein the player number transformation function comprises a combined function operative to:

apply a one-way function to the player number to produce an output;

choose at least one digit of the player number;

choose at least one digit of the output; and

combine the at least one digit of the player number and the at least one digit of the output to produce the transformed number.

25. Apparatus according to claim 23 or claim 24 and wherein the one-way function comprises a hash function.

26. A method for determining a winner of a game, the method comprising:

providing a player number associated with a player;

transforming the player number using a player number transformation function to produce a transformed number;

producing a winning number; and

determining whether the player is a winner of the game by comparing the winning number to the transformed number.

27. A method for determining a winner of a game, the method comprising:

providing a player number associated with a player;

storing the player number in a security device;

fixing an ending time;

preventing the storing step from being performed after the ending time;

providing a winning number;

comparing the stored player number to the winning number; and

determining whether the player has won the game based on a result of the comparing step.

28. A method for determining a winner of a game, the method comprising:

a player choosing a player number;

providing a winning number;

comparing the player number to the winning number; and

determining whether the player has won the game based on a result of the comparing step,

wherein the player number is not registered at a game control location prior to performing the determining step.

29. Defeating apparatus for defeating time stamp apparatus in which a plurality of messages including a time stamp message is externally supplied to a utilization device, the defeating apparatus comprising:

an incoming buffer for receiving and storing the plurality of messages; and

a time stamp filter for delaying delivery of the time stamp message.

30. A method for defeating a time stamp based anti-cheating method in which a plurality of messages including a time stamp message is supplied, the method for defeating comprising:

receiving and storing the plurality of messages; and

delaying delivery of the time stamp message.

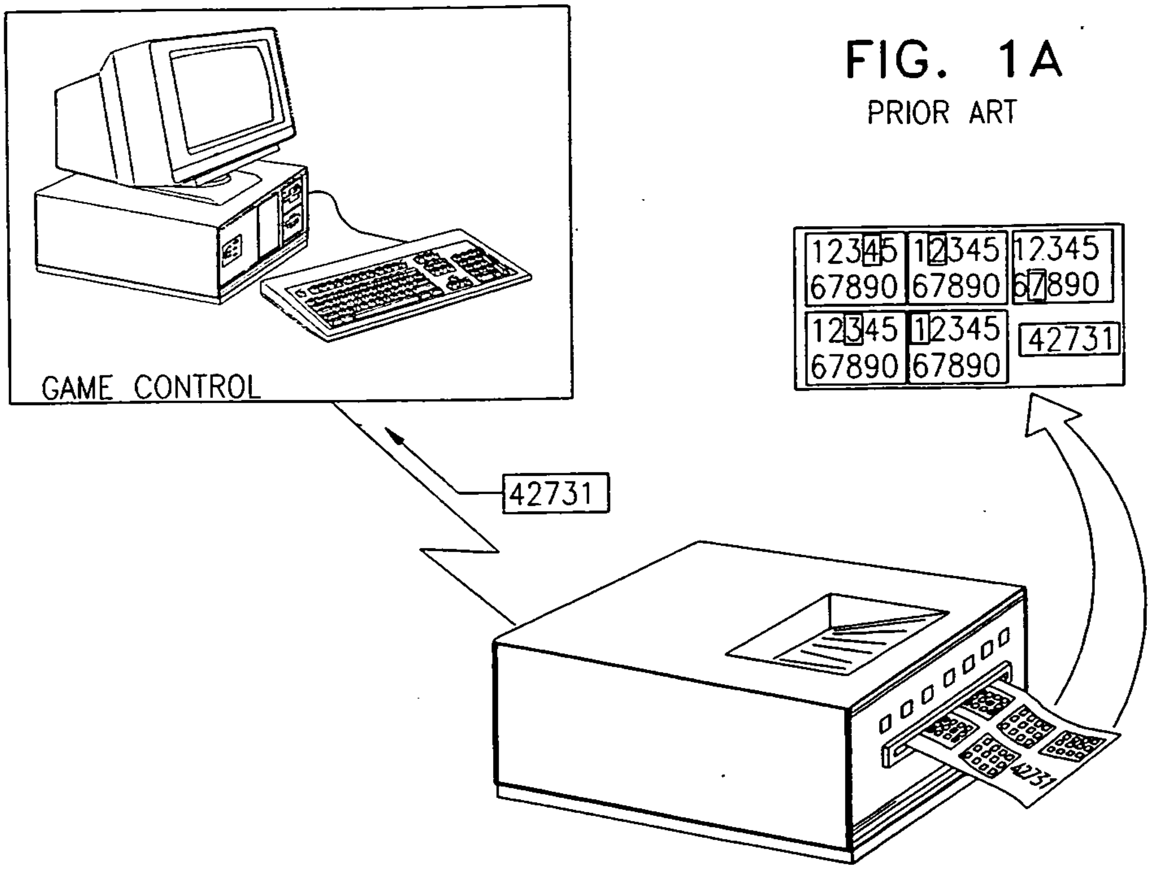


FIG. 1A
PRIOR ART

FIG. 1B
PRIOR ART

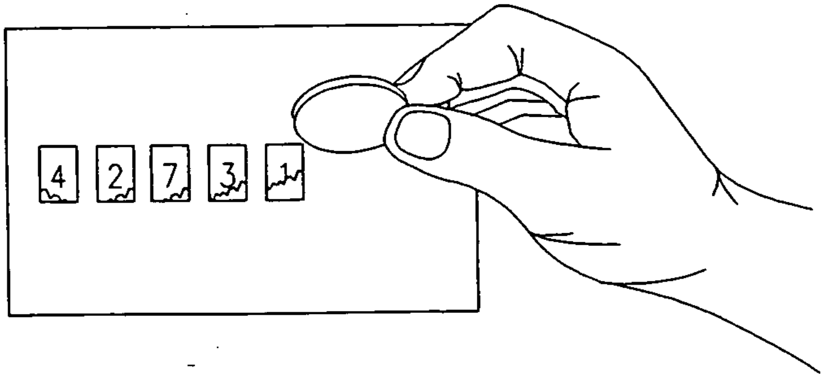
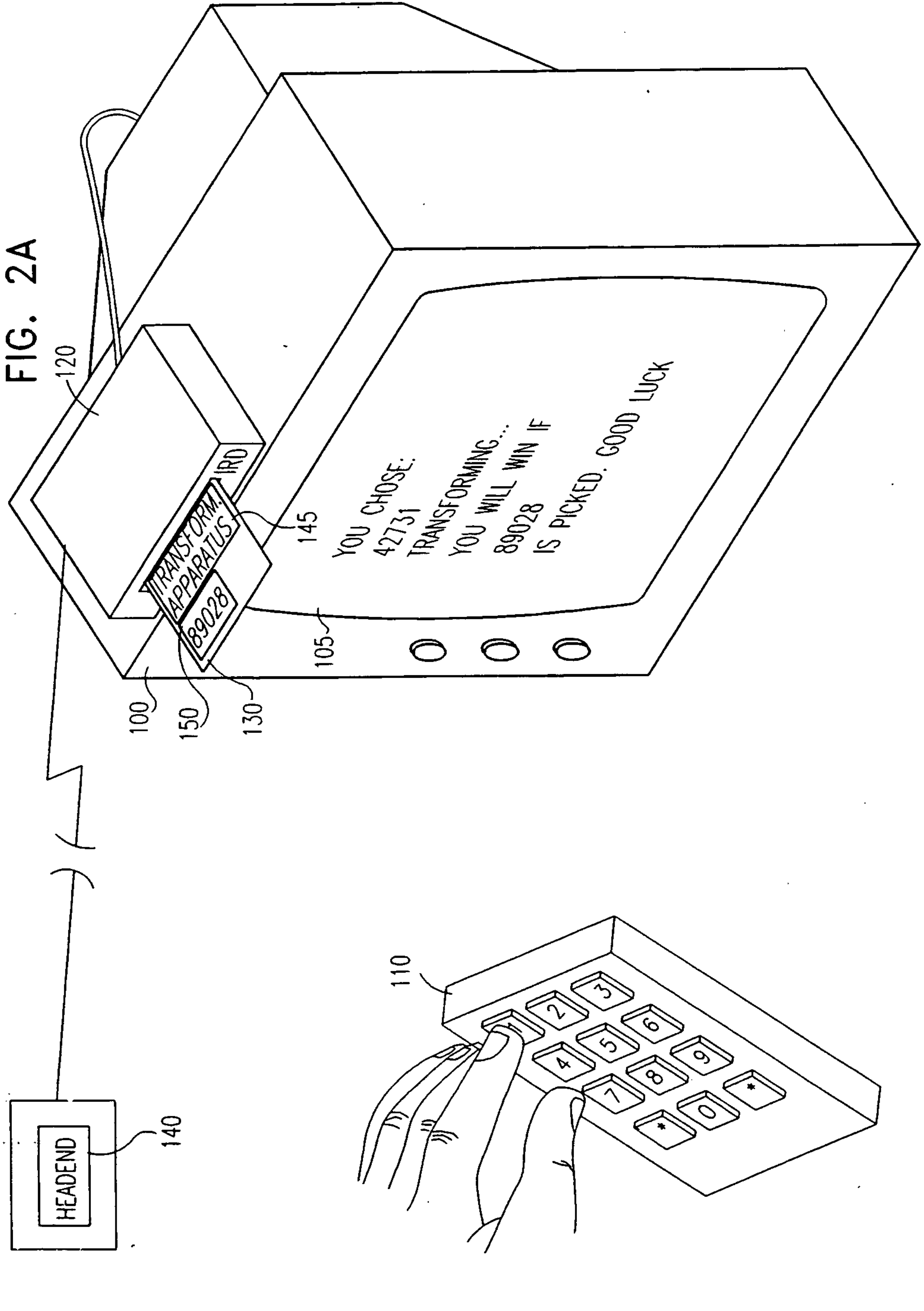


FIG. 2A


120
IRD
TRANSFORM.
APPARATUS
89028
145
YOU CHOSE:
42731
TRANSFORMING...
YOU WILL WIN IF
89028
IS PICKED. GOOD LUCK
105
100
150
130
HEADEND
140
110
1
2
3
4
5
6
7
8
9
*
0
*

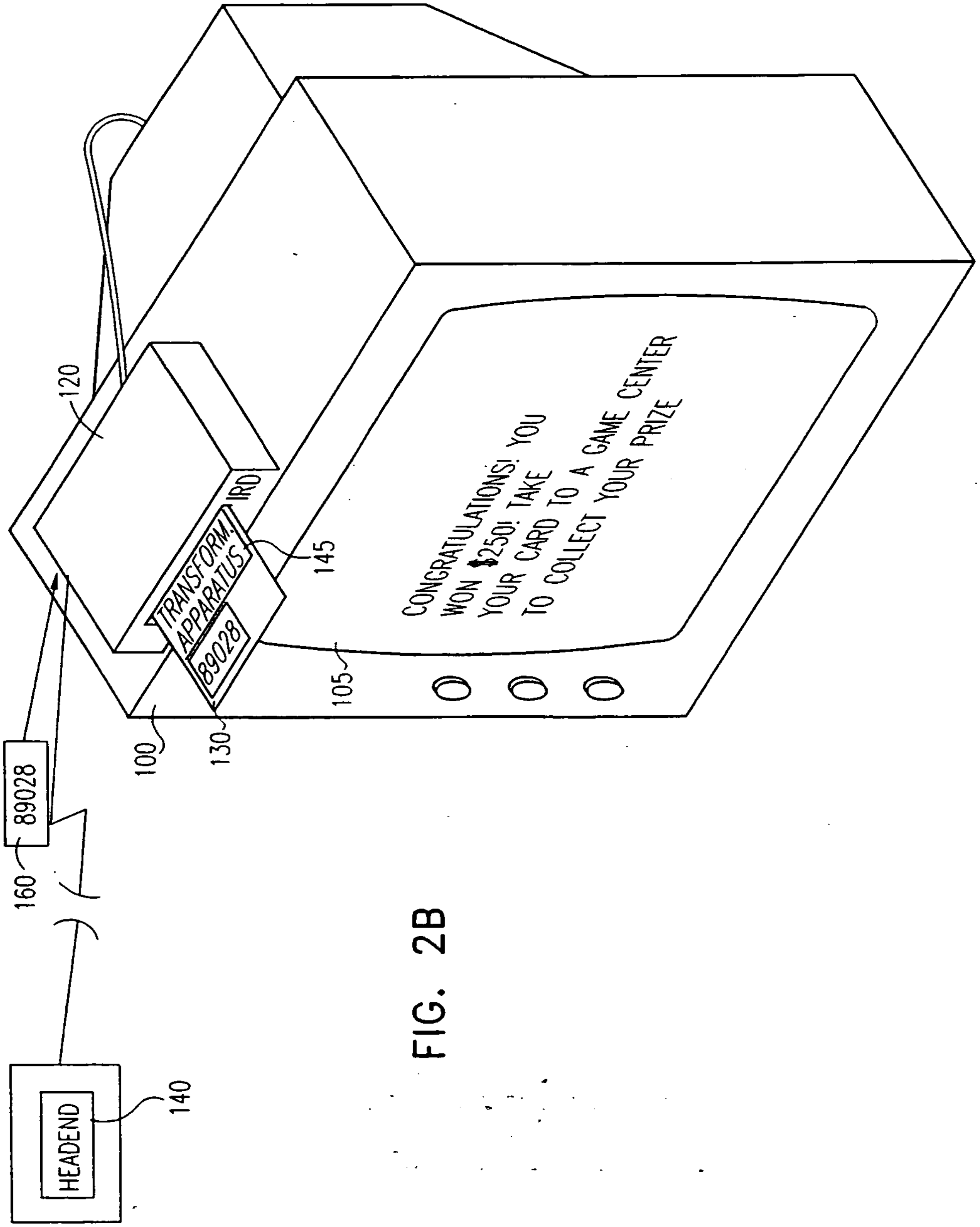

120
IRD
TRANSFORM.
APPARATUS
145
89028
130
100
105
CONGRATULATIONS! YOU
WON $250! TAKE
YOUR CARD TO A GAME CENTER
TO COLLECT YOUR PRIZE
89028
160
HEADEND
140

FIG. 2B

FIG. 3

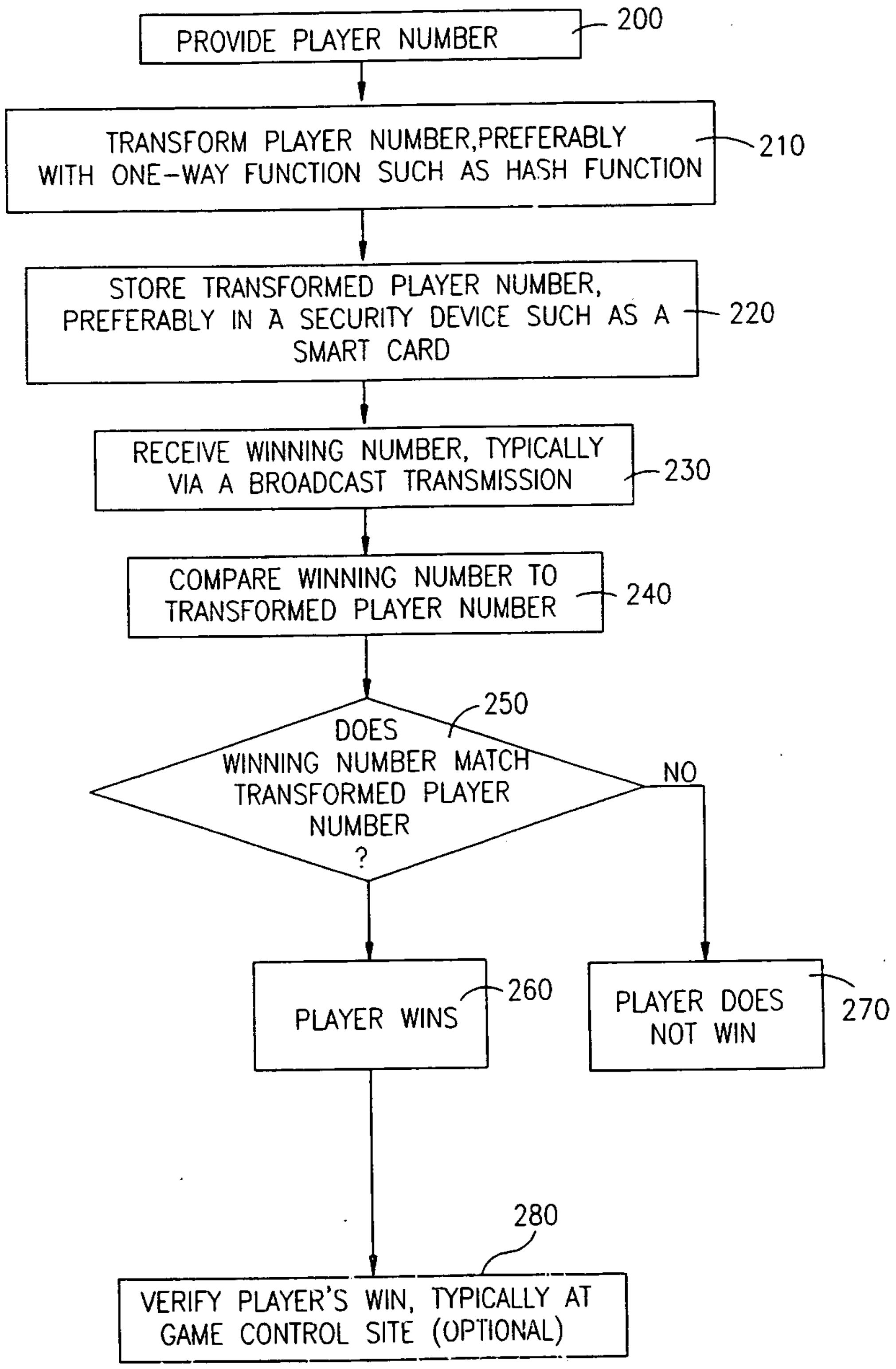

PROVIDE PLAYER NUMBER
200
TRANSFORM PLAYER NUMBER,PREFERABLY WITH ONE-WAY FUNCTION SUCH AS HASH FUNCTION
210
STORE TRANSFORMED PLAYER NUMBER, PREFERABLY IN A SECURITY DEVICE SUCH AS A SMART CARD
220
RECEIVE WINNING NUMBER, TYPICALLY VIA A BROADCAST TRANSMISSION
230
COMPARE WINNING NUMBER TO TRANSFORMED PLAYER NUMBER
240
250
DOES WINNING NUMBER MATCH TRANSFORMED PLAYER NUMBER ?
NO
PLAYER WINS
260
PLAYER DOES NOT WIN
270
280
VERIFY PLAYER'S WIN, TYPICALLY AT GAME CONTROL SITE (OPTIONAL)

FIG. 4A

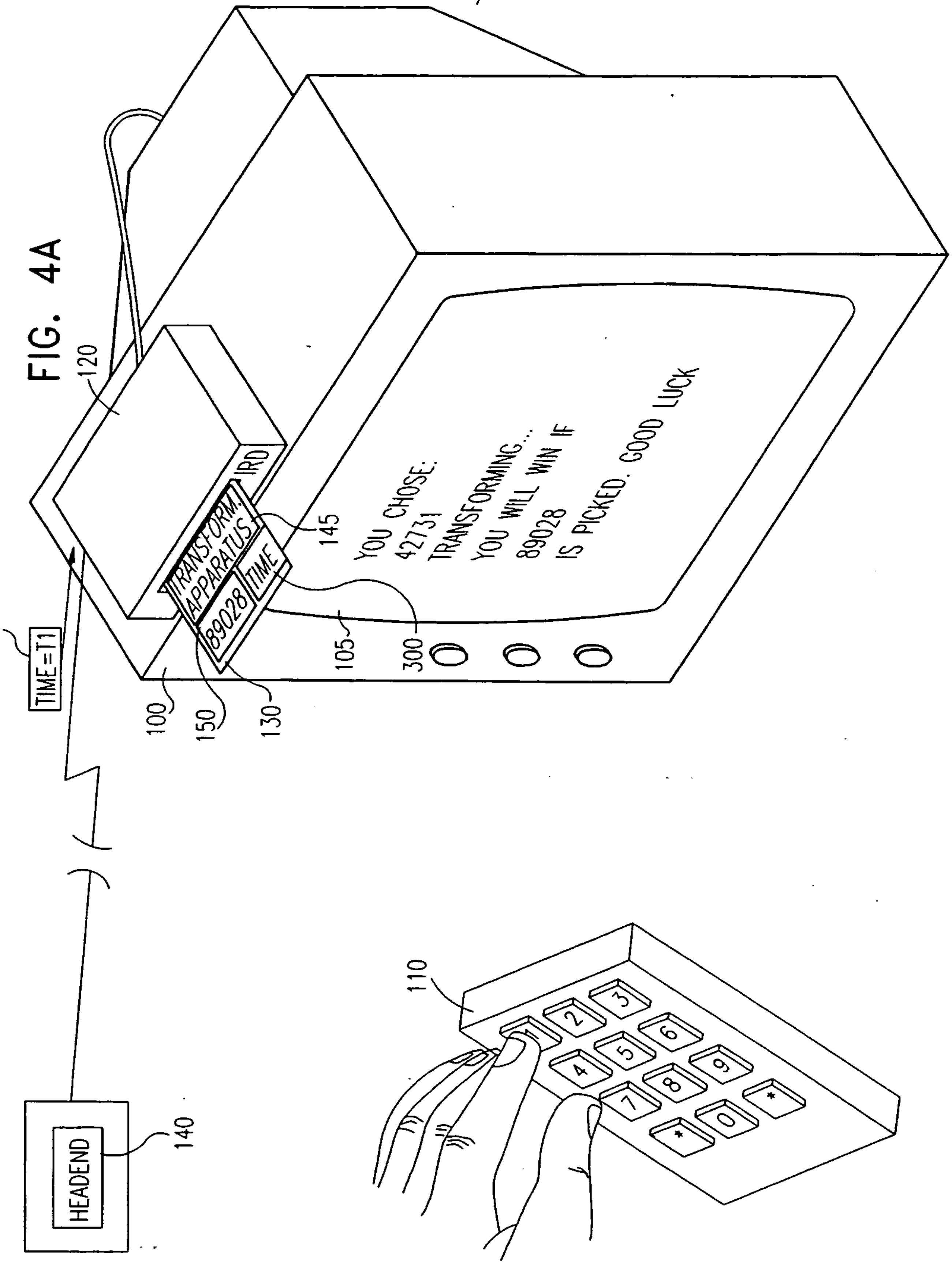
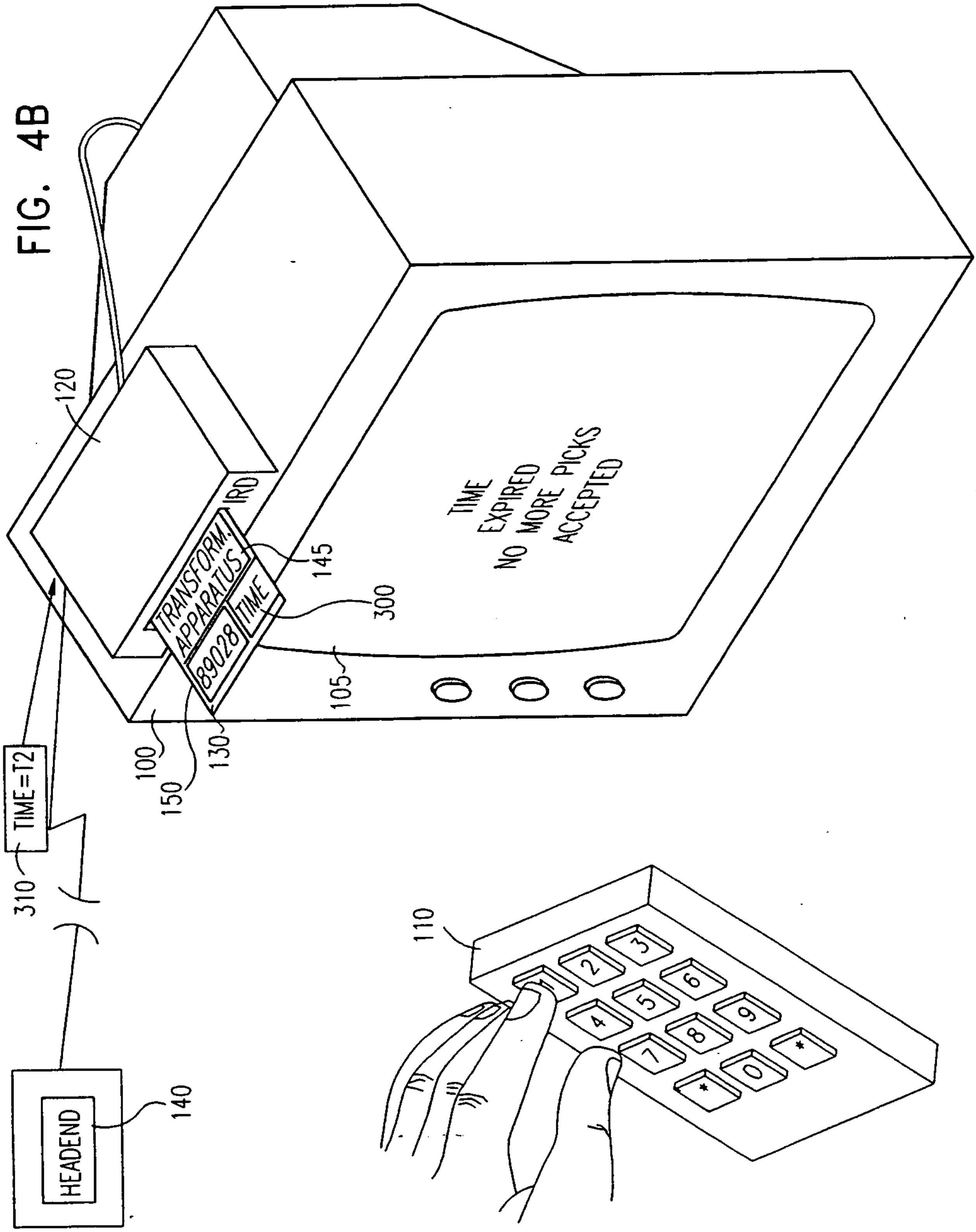

120
IRD
TRANSFORM.
APPARATUS
145
89028
TIME
300
105
100
150
130
290
TIME=T1
YOU CHOSE:
42731
TRANSFORMING...
YOU WILL WIN IF
89028
IS PICKED. GOOD LUCK
HEADEND
140
110
1
2
3
4
5
6
7
8
9
*
0
*

FIG. 4B


120
IRD
TRANSFORM. APPARATUS
145
89028
TIME
300
TIME EXPIRED NO MORE PICKS ACCEPTED
105
100
150
130
TIME=T2
310
HEADEND
140
110
1
2
3
4
5
6
7
8
9
*
0
*

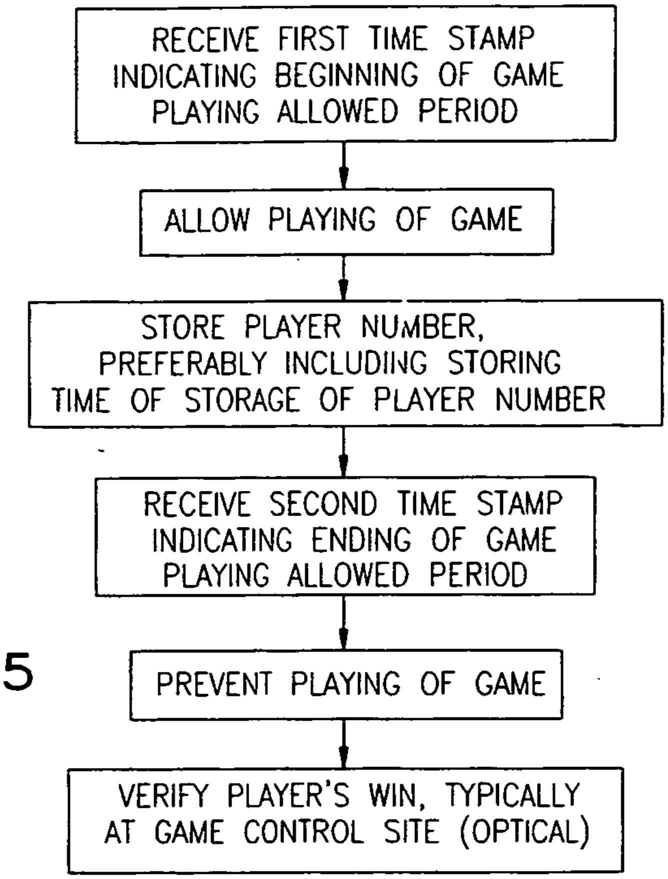

RECEIVE FIRST TIME STAMP INDICATING BEGINNING OF GAME PLAYING ALLOWED PERIOD
ALLOW PLAYING OF GAME
STORE PLAYER NUMBER, PREFERABLY INCLUDING STORING TIME OF STORAGE OF PLAYER NUMBER
RECEIVE SECOND TIME STAMP INDICATING ENDING OF GAME PLAYING ALLOWED PERIOD
PREVENT PLAYING OF GAME
VERIFY PLAYER'S WIN, TYPICALLY AT GAME CONTROL SITE (OPTICAL)

FIG. 5

FIG. 6

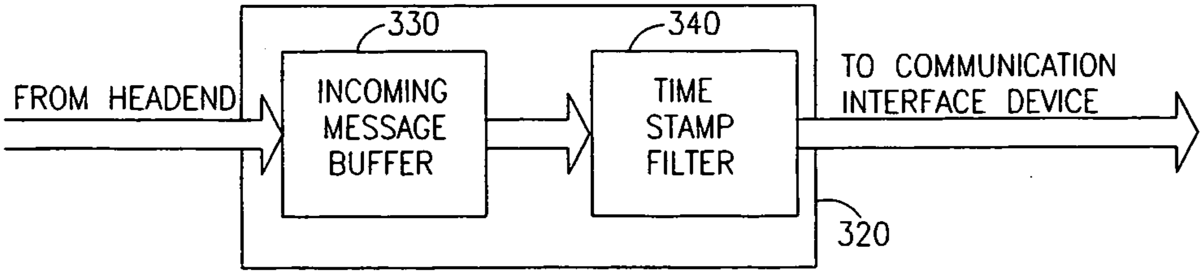
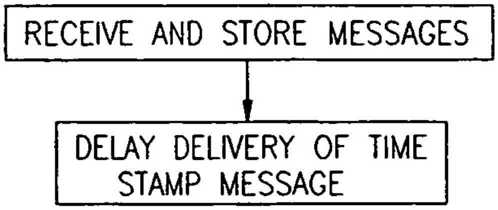


FIG. 7


RECEIVE AND STORE MESSAGES
DELAY DELIVERY OF TIME STAMP MESSAGE

PCT

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International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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G07F 17/32

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(30) Priority Data:
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(71) Applicant *(for all designated States except US)*: NDS LTD. [GB/GB]; 1 Heathrow Boulevard, 286 Bath Road, West Drayton, Middlesex UB7 0DQ (GB).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: TSURIA, Yossef [IL/IL]; Makabim Street 77, 73142 Shoham (IL). BAUMINGER, Ilan [IL/IL]; Elkahi Street 11/7, 93785 Jerusalem (IL).

(74) Agents: SANFORD, T., Colb et al.; Sanford T. Colb & Co., P.O. Box 2273, 76122 Rehovot (IL).

(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

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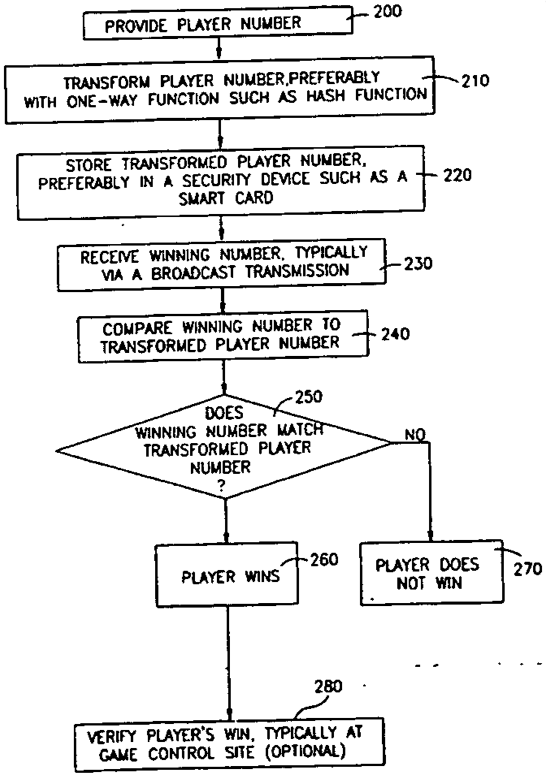
23 September 1999 (23.09.99)

(54) Title: GAME SYSTEM

(57) Abstract

A game method for playing a game having a plurality of players, the method including, for at least one of the plurality of players: choosing a player number associated with the player, transforming the player number using a player number transformation function to produce a transformed number, storing the transformed number, providing a winning number, the winning number being identical for each of the plurality of players, comparing the winning number to the transformed number, and determining whether the player has won the game based on a result of the comparing step. Related apparatus and methods are also provided.


PROVIDE PLAYER NUMBER
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TRANSFORM PLAYER NUMBER,PREFERABLY WITH ONE-WAY FUNCTION SUCH AS HASH FUNCTION
210
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PLAYER DOES NOT WIN
270
280
VERIFY PLAYER'S WIN, TYPICALLY AT GAME CONTROL SITE (OPTIONAL)

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LI	Liechtenstein
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LR	Liberia
LS	Lesotho
LT	Lithuania
LU	Luxembourg
LV	Latvia
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MN	Mongolia
MR	Mauritania
MW	Malawi
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INTERNATIONAL SEARCH REPORT

Inter ınal Application No
PCT/IL 99/00012

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G07F17/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 80 02512 A (TELE VEND INC. ET AL.) 27 November 1980 (1980-11-27)	1,5,6, 10,13, 14, 16-20, 26,28
Y	page 13, last paragraph - page 14, line 16	2,4,7,8, 12,15, 21-23,25
A	page 15, line 18 - page 18, line 9; figures	3,11,24, 27

Y	WO 97 19537 A (WALKER ASSET MANAGEMENT) 29 May 1997 (1997-05-29) page 19, last paragraph	2,4,23, 25

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search
28 April 1999

Date of mailing of the international search report
12. 08. 1999

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1

INTERNATIONAL SEARCH REPORT

Inter   onal Application No
PCT/IL 99/00012

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	EP 0 450 520 A (GANOT) 9 October 1991 (1991-10-09) column 2, line 43 - column 5, line 34; figures	26-28 7,8,12, 15,21,22 1,5,10, 11,13, 14,16-19

A	EP 0 360 613 A (BALLY MANUFACTURING CORP.) 28 March 1990 (1990-03-28) column 7, line 6 - line 40; figures	1,5-9, 11, 16-22, 26-28

1

Int...ational application No.
PCT/IL 99/00012

INTERNATIONAL SEARCH REPORT

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. □ Claims Nos.:
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2. □ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. □ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. □ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. □ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. □ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-28

Remark on Protest

□ The additional search fees were accompanied by the applicant's protest.

□ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/IL 99/00012

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-28

   Lottery gaming system.

2. Claims: 29,30

   Apparatus and method whereby delivery of a time stamp is delayed.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/IL 99/00012

Patent document cited in search report		Publication date	Patent family member(s)			Publication date
WO 8002512	A	27-11-1980	EP	0028652	A	20-05-1981
WO 9719537	A	29-05-1997	US	5768382	A	16-06-1998
			AU	1081997	A	11-06-1997
			EP	0862824	A	09-09-1998
EP 450520	A	09-10-1991	NONE			
EP 360613	A	28-03-1990	US	5179517	A	12-01-1993
			AT	116754	T	15-01-1995
			AU	613484	B	01-08-1991
			AU	3450489	A	29-03-1990
			DE	68920391	D	16-02-1995
			DE	68920391	T	27-07-1995